the lowest reported ship reading was 28.93 (uncorrected), made on the Japanese motorship *Hiye Maru*, January 1, in 47°30′ N., 167°46′ E.

On southern waters of the ocean, departures of pressure from the normal were small, but generally negative, Midway Island showing the greatest difference from normal, −0.08 inch.

A feature of unusual interest is the pronounced reversal from normal pressure conditions, as affecting a winter month, between Midway Island, in the usual January high pressure belt, and Dutch Harbor, in or near the position of the usually strongly intrenched Aleutian LOW. The pressure at Dutch Harbor was 0.20 inch higher than that at Midway Island, which is extraordinarily anomalous for January.

TABLE 1.—*Averages, departures, and extremes of atmospheric pressure at sea level, North Pacific Ocean, January 1937, at selected stations*

Stations	Average pressure	Departure from normal	Highest	Date	Lowest	Date
	Inches	*Inch*	*Inches*		*Inches*	
Point Barrow	29.96	−0.12	30.86	31	29.06	1
Dutch Harbor	30.15	+.57	30.84	29	29.50	1
St. Paul	30.02	+.39	30.84	29	29.26	20
Kodiak	30.24	+.65	30.70	29	29.68	2
Juneau	30.22	+.34	30.83	4	29.57	24
Tatoosh Island	30.04	+.06	30.54	6	29.44	13
San Francisco	30.08	−.03	30.40	2	29.71	5
Mazatlan	29.92	−.03	30.02	25	29.84	13, 21, 22
Honolulu	29.94	−.06	30.08	15	29.70	30
Midway Island	29.95	−.08	30.14	6	29.64	18
Guam	29.88	−.02	29.94	26, 27, 29, 30	29.77	1, 9
Manila	29.87	−.02	29.94	25	29.74	2, 3
Hong Kong	30.05	−.06	30.28	11	29.84	31
Naha [1]						
Chichisbima [1]						
Urakawa	29.99	+.06	30.30	31	29.53	5

[1] Missing.

NOTE.—Data based on 1 daily observation only, except those for Juneau, Tatoosh Island, San Francisco, and Honolulu, which are based on 2 observations. Departures are computed from best available normals related to time of observation.

Cyclones and gales.—The eastern third of the ocean was practically free of cyclonic storms during January. Even as far north as Kodiak the lowest pressure, which occurred on the 2d, was 29.68, thus indicating weak cyclonic activity in northeastern waters. From 160° west longitude eastward to the American coast few ships encountered gales, and such as were met did not exceed eight in force. These were reported on 5 days: On the 6th, scattered over middle and higher latitudes; on the 9th near 42° N., 158½° W.; on the 20th, about 100 miles southwest of San Francisco; and on the 12th and 16th as intensified trades experienced by the steamer *Steel Voyager* along the twentieth parallel far to the eastward of the Hawaiian Islands.

From midocean westward cyclonic activity, while more vigorous than to the eastward, was less than is normal for January. On 4 days, however, gales of force 11, accompanied by only moderately low pressures, were experienced in scattered localities: On the 2d by the American steamer *Washington*, in 42½° N., 178° E.; on the 6th by the same steamer, in 42½° N., 168° W.; and on the 30th and 31st by the Japanese motorship *Hokuroku Maru* 2 and 3 days out from Yokohama on a voyage toward Los Angeles. This last-named ship, it may be added, encountered a force-10 gale on the 29th. The last 3 days of January, for the locality east of Honshu, provided the stormiest weather for any part of the ocean during the entire month. With the exception of the locally high winds of these dates, and an isolated gale of force 9 near 39° N., 175½° E., on the 29th, the latter half of the month was practically galeless over all parts of the ocean. The period of most frequent and widespread, and for the greater part moderate, storminess was that of the 1st to 7th, mostly confined to the western half of the sailing routes.

No tropical depressions of consequence were reported.

Fog.—Scattered fog was observed on 10 days within the region 35° to 45° N., 180° to 140° W., and on only 1 day outside it.

TYPHOON AND DEPRESSIONS OVER THE FAR EAST, DECEMBER 1936

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One typhoon and two depressions were reported this month. Of these, the typhoon was by far the most important disturbance; the depressions were mild and apparently of little importance.

Typhoon, November 28 to December 5.—From November 28 to December 1 a low-pressure area over the western Caroline Islands developed into a depression which moved west-northwest and then west. On December 1 it was about 400 miles east of San Bernardino Strait and, as it moved in a westerly direction toward the Philippines, it intensified into a typhoon. Its movement was quite rapid, so much so that evening observations (Dec. 1) from stations around San Bernardino Strait indicated that the locality was in danger. On December 2, 6 a. m., the center was about 60 miles east by south of Virac, Cataduanes Island, and moving west. During the day it passed close to and north of Legaspi, Albay Province. It continued this westerly course to Bondoc Peninsula, where it began to incline west-northwest, thus threatening the city of Manila. It proceeded along this course into the China Sea; the late afternoon and night hours of December 2 were anxious ones in Manila. The center passed close to and south of Manila about 7 a. m., December 3, fortunately very much weaker. The next day (Dec. 4) found it in the China Sea, still moving west-northwest, very weak, and on December 5 no traces of the storm could be found.

The following barometric minima were reported along the course of the typhoon: Virac, Cataduanes Island, on December 2, 8:40 a. m., had 738.00 mm (29.055 inches), with east winds of force 10. Legaspi, Albay Province, recorded 738.45 mm (29.073 inches), with southwest winds of force 9 at 10:45 a. m. Naga, Camarines Sur, experienced a relative calm, 2 to 3:15 p. m. of the same day. Afterward south winds, force 10, blew over the city. The absolute minimum occurred at 2 p. m., a value of 729.81 mm (28.665 inches) with north-northeast winds, force 10, which ceased at that moment. Atimonan, Tayabas Province, was affected after the typhoon inclined to the west-northwest. At 11 p. m., December 2, a relative calm was experienced, which lasted until 1 a. m., December 3. There was no rain, it was reported; however, no stars were visible. Southeast winds, forces 2 and 3, were blowing during this period. The absolute minimum was recorded at 10:15 p. m., 45 minutes before the calm area reached the city. The value observed was 742.07 mm (29.240 inches) and the winds were northeast and force 7 at the time. At Manila, 5:55 a. m., the absolute minimum was recorded, namely, 748.30 mm (29.461 inches), while northwest winds, force 6, were blowing. Throughout the early morning hours northwesterly winds prevailed, forces 5 and 6; the maximum velocity observed was 38 m. p. h. (The above pressure values have been corrected for gravity.)

The destruction due to this typhoon must be considered under two divisions: That due to the typhoon center as it passed over southern Luzon, from San Bernardino Strait to the China Sea, and that due to the heavy rains over Isabela Province. The ruin from the latter was very extensive. On December 2 and 3, as the typhoon moved across the Archipelago toward the China Sea three lives were lost together with considerable damage to houses of light material and to crops. On December 3, however, there were heavy rains over the headwaters of the Cagayan River due to the front between the southeasterly winds of the typhoon and the northeast monsoon air. The result was a terrible flood along the Cagayan River valley; the damage was greatest in Isabela Province. The provincial governor reported that one family was carried on a raft from their town in Isabela Province to a point about three miles from the mouth of the river because there was no chance to rescue them along the course of the river. The rich tobacco land along the banks of the river has been almost useless because of the thick deposit of gravel and sand left by the waters. The people suffered greatly; towns and cities along the banks were washed away suddenly by the rapid onrush of the flood. On December 18, after the government officials had visited the region and made their reports, a report of 67 dead and 173 missing was made to the public. The rainfall reports received from Echague, Isabela Province, during the period of the flood, are as follows: for the 24-hour periods ending at 6 a. m. December 3, 1.23 inches; 6 a. m. December 4, 6.81 inches; and 6 a. m. December 5, 1.68 inches. These are the only data available at present concerning the intensity of the rainfall, which caused these destructive floods so far from the path of the center of the typhoon.

Depression, December 16 to 24.—From December 16, 2 p. m., until the 18th, there existed a low-pressure area over the Western Caroline Islands, having only a vague center which moved toward the Philippines. On the morning of the 19th, there seemed to be a depression about 300 miles east of Mindanao. From the data available at the time, it was apparently moving west-northwest toward Surigao Strait. Later on, however, it was located south of Mindanao, so that its course on December 19 and 20 was west-southwest. It continued west-southwest across southern Mindanao, crossed the Moro Gulf inclining westward, passed over the northern part of the Sulu Archipelago during the afternoon of December 21, moving west by north, and entered the China Sea through the Balabac Strait. Not until December 24 could one be sure that it had filled up. At no portion of its course did it appear to have any great intensity.

Depression, December 21 to 26.—A low-pressure area over the western Caroline Islands, December 21 to 23, finally manifested itself as a depression central about 180 miles west by north of Palau Island. From this position it moved northwest to the island of Samar and was located between Borongan and Calbayog at 6 a. m. December 24. It changed its course to the west and crossed the Visayan Islands during the forenoon and afternoon. The next day, it was in the China Sea and was becoming weaker; on December 26 it was reported to be filling up. At no time were there any strong winds at the surface; and the lowest barometer reading reported was 752.1 mm (29.610 inches) from Calbayog, Samar, on December 24 at 6 a. m. Even though the winds were not strong and the barometers were quite high, there was rainfall over a large area around the center of the depression.

CLIMATOLOGICAL TABLES

DESCRIPTION OF TABLES AND CHARTS

(J. P. Kohler)

Table 1 presents average and extreme values for 45 climatic districts, based on all available data ascertained by regular and cooperative Weather Bureau stations.

Table 2 gives the data ordinarily needed for climatological studies for about 180 Weather Bureau stations making simultaneous observations at 7:30 a. m. and 7:30 p. m. daily, seventy-fifth meridian time, and for about 20 others making only one observation. The altitudes of the instruments above ground are also given.

Beginning with January 1, 1932, all wind movements and velocities published herein are corrected to true values by applying to the anemometer readings corrections determined by actual tests in wind tunnels and elsewhere.

Table 3 gives, for about 37 stations of the Canadian Meteorological Service, the means of pressure and temperature, total precipitation, depth of snowfall, and the respective departures from normal values except in the case of snowfall. The sea-level pressures have been computed according to the method described by Prof. F. H. Bigelow in the REVIEW of January 1902, **30:** 13–16.

Table 4 lists the severe local storms reported in the United States during the month. It is compiled from reports furnished mostly by officials of the Weather Bureau.

CHART I.—*Temperature departures.*—This chart presents the departures of the monthly mean surface temperatures from the monthly normals. The shaded portions of the chart indicate areas of positive departures and unshaded portions indicate areas of negative departures. Generalized lines connect places having approximately equal departures of like sign. This chart of monthly surface temperature departures in the United States was first published in the MONTHLY WEATHER REVIEW for July 1909, but smaller charts appear in W. B. Bulletin U for 1873 to June 1909, inclusive.

CHART II.—*Tracks of centers of* ANTICYCLONES; and

CHART III.—*Tracks of centers of* CYCLONES. The roman numerals show the chronological order of the centers. The figures within the circles show the days of the month, the location indicated being that at 7:30 a. m., seventy-fifth meridian time. Within each circle is also an entry of the last three figures of the highest barometric reading (chart II) or (chart III) the lowest reading reported at or near the center at that time, in both cases as reduced to sea level and standard gravity. The intermediate 7:30 p. m. locations are indicated by dots. The inset map on chart II shows the departure of monthly mean pressure from normal and the inset on chart III shows the change in mean pressure from the preceding month.

The use of a new base map for charts II and III began with the January 1930 issue.

CHART IV.—*Percentage of clear sky between sunrise and sunset.*—The average cloudiness at each regular Weather Bureau station is determined by numerous personal observations between sunrise and sunset. The difference between the observed cloudiness and 100 is assumed to represent the percentage of clear sky, and the values thus obtained are the basis of this chart. The chart does not relate to the night hours.